

**B.G.A. TECHNICAL COMMITTEE**  
**TECHNICAL NEWSHEET TNS 3/4/87.**

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**PART 1 AIRWORTHINESS "AGGRO"** (Please add to the 1987 Green Pages)

- 1.1. IS.30 Service Bulletin CR-3 introduces reinforcement of the undercarriage structure - Details from U.K. agents.
- 1.2. D.G.300 Tech/Note 359/11 introduces more Aileron Mass Balance. Details from U.K. Agents
- 1.3. T.65A - VEGA Excess free-play in undercarriage actuator arm, causes undemanded retraction ( Reported by I.D. Edwards).
- 1.4. ASTIR CS/77 AIRBRAKE CONTROL ROD in centre-section found buckled. Possibly caused by "frozen" speed-brake paddles. (Sketch attached from Cambridge G.C.).
- 1.5. Centrair 101 "Pegasus". SB 101-7 introduces revised tolerances for Aileron Mass Balance. Details from U.K. agents.
- 1.6. D.G. 300 Elevator Automatic Coupling found misaligned. Guide block introduced. Previously reported in TNS/7/85. (Reported by Ron King, West Sussex.)
- 1.7. IS.32A Fatigue-life limitations of 3000hrs/15000 landings are introduced by Bulletin E0-2 from U.K. Agents.
- 1.8. JANUS CM Tech/Note 809-4 introduces changes to Engine Accessories & Placards (From U.K. agents).
- 1.9. ASTIR CS (Wks No. 1023) Rudder hinge unbonded. Repaired as per attached sketch. Reported by Peterborough Sailplanes.
- 1.10. PIONEER PARACHUTES as listed in attached F.A.A. A/D 86-24-03, may be defective.
- 1.11. STAMO ENGINE - excessive crankshaft end-float caused magneto drive to disconnect, and to re-engage. Thrust washer at magneto-drive badly worn. Propeller end-float should be checked on Daily Inspection (with IGNITION switched OFF). Reported by Surrey Hills G.C. Thrust bolt secured with Soft LOCTITE.
- 1.12. LIGHTNING STRIKE damages T.21 Elevator Cables 60% burning of both elevator cables found on C. of A. renewal, some months after an apparent "strike"! Spoiler cables and tow release cable also damaged. Whereas bonding may not have been incorporated, and apparent damage found to be negligible, lightning strikes can damage your health in more ways than standing under trees! AN IN-DEPTH INSPECTION IS REQUIRED. (Reported by Brackley G.C.).
- 1.13. VENTUS (Serial No's 1 thru 284 inc) Flap Drive in fuselage - cracking at the weld between flap drive and flap torque tube. T/Note 349-9 requires re-inforcement. Details from Agents.
- 1.14. "EXPLODING" 12 volt aircraft batteries. Several cases are now on record of failure of the terminal posts on these batteries used in most tugs - loose terminals should be rejected a.s.a.p. A battery gas explosion has recently occurred in the U.K.!
- 1.15. ENGINE FIRE (LYCOMING O-320) The attached extract from G.A.S.I.L. 12/86 once again refers to the sinking of "plastic" carburettor floats, using 100 LL AVGAS!
- 1.16. FATAL FORCED LANDING - COCKPIT ELECTRICAL "FIRE" Gasil 2/87 reports this fatality initiated by "smoke in the cabin" generated by an overheated electrical failure warning system! This type of equipment is used on most aircraft! If smoke appears, shut off all electrics and open the window/ door.

- 1.17 C.A.A. FOREIGN AIRWORTHINESS DIRECTIVES are attached as follows: Compliance is required at next inspection.
- a) D.G. 400 August 1986
  - b) Pk 20E November 1983
- 1.18 MOTOR GLIDER ACCIDENTS Extracts from A.I.B. Bulletins:
- a) SF 25E - Shrivenham - Too low/too late!
  - b) SF 25B - Pocklington - Spinal injuries might have been minimised if the occupants had been using energy absorbing rubber cushions as devised by Dr. Tony Segal at Lasham, from whom supplies are available.
- 1.19. Ka 23 - FAILURE OF TRIM SPRING (Could apply to other types). Whereas failure of the trim spring should be survivable the broken bits may jamb the elevator controls (Reported by Wyvern G.C., Upavon.)
- 1.20. KA 6E - TAILPLANES The attached sketch outlines damage discovered & rectified by C.G. Sanders.

## PART 2 GENERAL MATTERS

- 2.1. JANUS Product Support (Also Mosquito) Please amend the 1987 "Green Pages" to show that Southern Sailplanes are responsible for product support (apologies for error).
- 2.2. V.W. Engines (& variants) - supply of gaskets Filters International (Mr. R. Lloyd) Bicester 240909 can supply. Also for Grob G.109s.
- 2.3. Ka8, drag-pin holes in fuselage frame may be reamed. 2mm oversize to 14mm (Southdown Aero Services have details).
- 2.4. STAMO ENGINES - possible replacement. The 1600cc "DANUM" engine developed and C.A.A. certificated by Doncaster Sailplanes (0362-537695) is a possible replacement for delapidated Stamos!
- 2.5. Bathroom Scales can endanger your health, since their accuracy is frequently questionable, and should be checked calibrated with a known weight (Polythene water container) at or about the expected re-action weight. When applied to the tailskid the error can be multiplied by the moment arm!
- 2.6. Weighing Technical Services (Bill Galen, 063877-342) can electronically weigh your entire club fleet in one session, why not have a go?
- 2.7. G.R.P. Laminators Course (1987) The attached list of courses from the MARINE BUILDERS TRAINING TRUST may be of interest?
- 2.8. Protection of Propeller Blades 3M adhesive tape is available from SOARING EQUIPMENT Ltd., 193 Russell Road, Moseley, Birmingham, B13 8RR (021 449 1121).
- 2.9. WINCH CABLE Advice on the correct preparation of flexible steel winch cable is available from Perry Clamps Ltd., copy attached.
- 2.10. "WINCHING" The collected works of John Gibson, as published in S. & G. are now available from the B.G.A. office at £1.50. Excellent advice for winch builders, gliding instructors, and glider pilots, particularly those who are apprehensive! Club Safety Officers should have a copy!
- 2.11. CIVIL AVIATION AUTHORITY C. OF A. CHARGES  
are increased to £30 per 500 kgs (or part thereof) per year of validity, with effect 1st April 1987.  
Typically, the C. of A. renewal fee payable to the B.G.A. for a motor-glider weighing 550 kgs will be £180 ! (Ref C.A.A. Notice No. 25)

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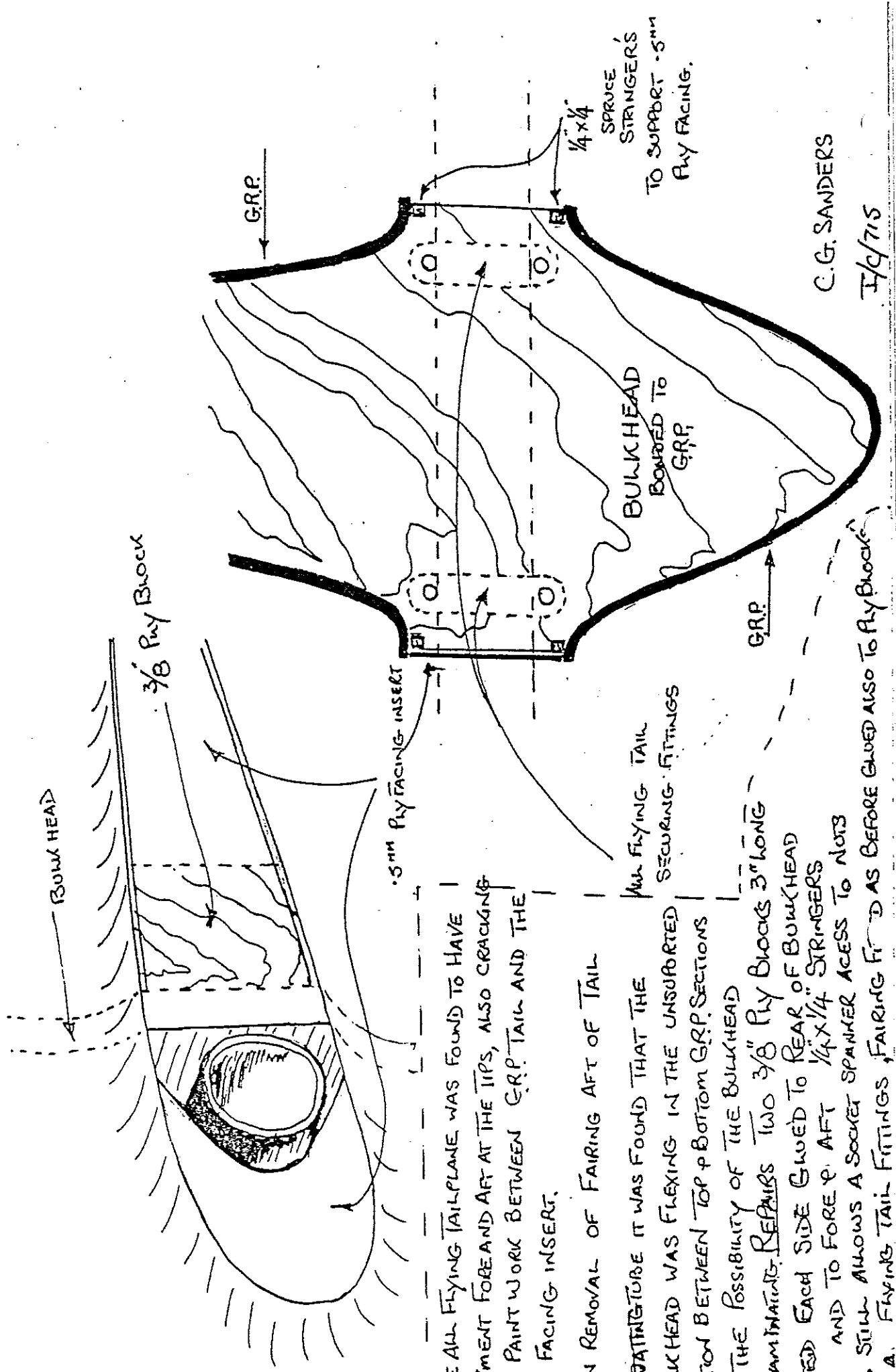
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BRATINS 3/A/87

TAIL PLANE

K.A. 6E.

9934



C.G. SANDERS

F/c/75

THE ALL FLYING TAIL PLANE WAS FOUND TO HAVE MOVEMENT FORE AND AFT AT THE TIPS, ALSO CRACKING OF PAINT WORK BETWEEN GRP TAIL AND THE PLY FACING INSERT.

ON REMOVAL OF FAIRING AFT OF TAIL

ACTUATING IT WAS FOUND THAT THE BULK HEAD WAS FLEXING IN THE UNSUPPORTED SECTION BETWEEN TOP & BOTTOM GRP SECTIONS

WITH THE POSSIBILITY OF THE BULK HEAD DELAMINATING. REPAIRS TWO 3/8" PLY BLOCKS 3" LONG FITTED EACH SIDE GLOUED TO REAR OF BULK HEAD AND TO FORE & AFT 1/4" X 1/4" STRINGERS

THIS STILL ALLOWS A SOCKET SPANNER ACCESS TO NUTS OF A. FLYING TAIL FITTINGS, FAIRING FITTINGS AS BEFORE GLOUED ALSO TO PLY BLOCKS

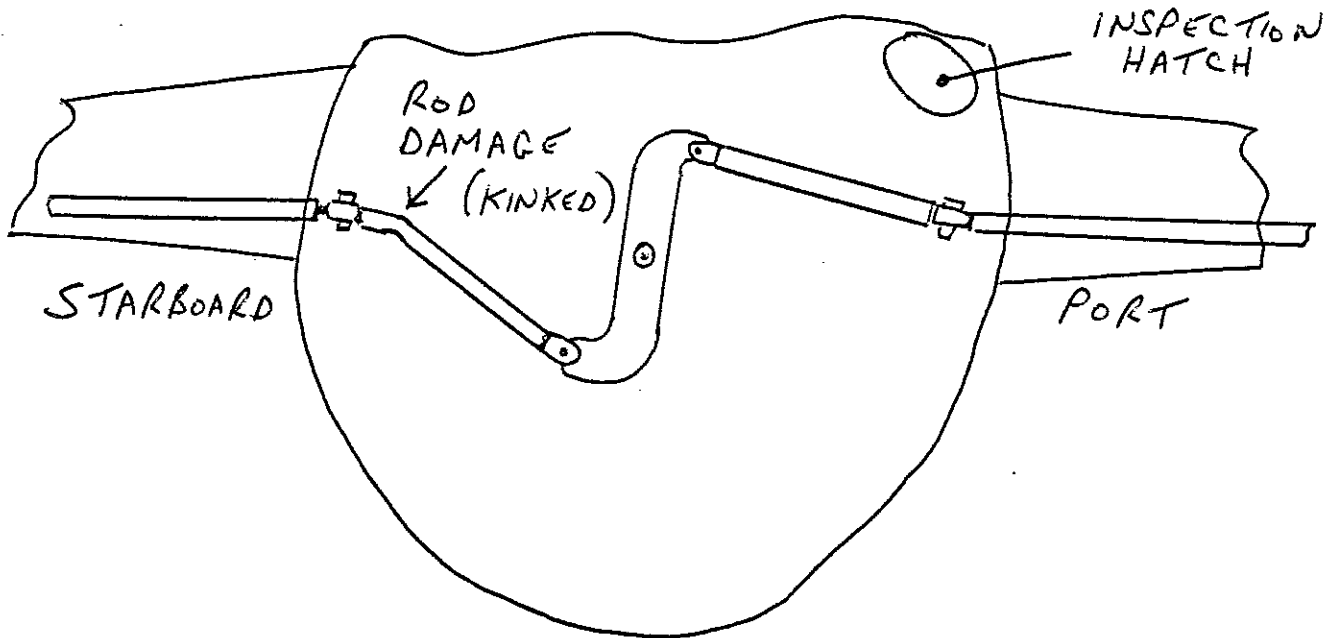
ALL FLYING TAIL SECURING FITTINGS

172 CS 77

TNS/3/87

REPORTED BY S. TORRANCE

### AIRBRAKE SYSTEM IN FUSELAGE



VIEW LOOKING AFT  
(AILERON CIRCUIT OMITTED FOR CLARITY)

### 3. ENGINE COMPARTMENT FIRE

G.A.S.I.L. 12/86 P/E

Aircraft : Piper PA28-161 Cherokee Warrior  
 Date : October 1986  
 Engine Type : Lycoming O-320

SINKING CARB: FLOATS !!

The approach and landing were normal and all gauges and instruments read correctly. On turning off the runway at the intersection, the engine cut out. The pilot stopped the aircraft and attempted to re-start the engine, but with no result, so he switched off, checked the mixture was off, opened the throttle, turned the engine again a few times and switched off. He then tried a normal re-start. After a few turns, the engine fired and then stopped, either by itself or because the pilot had switched off the magnetos because the passenger in the righthand seat stated that there was smoke coming from the engine. The pilot told the passenger to get out. The passenger took the fire extinguisher and used it on the engine air intake, by a coincidence he was a fireman! By this time the pilot had set the mixture control to lean, opened the throttle fully, turned the engine three times and switched off. All switches were then turned off, the airport fire crew arrived quickly and checked the engine compartment for safety before towing the aircraft to the hangar. Investigation revealed quite extensive damage in the engine compartment with all electrical wiring melted, induction system hoses scorched etc. The air intake box, air valve, etc. were burnt and the nose leg fairing had melted and the lower nose cowling was scorched. The alternator and starter were subjected to heat and will require examination before return to service. For some time during the past month, the aircraft has been suffering from over-rich mixture at idle with engine stoppage. A leak and level check were twice carried out and the results were satisfactory. The reporter believes that the composite float has suffered from degradation using 100LL fuel and recommends that the operator fit the modified new style metal float. The fire had originated in the carburettor air box area.

No: 1/87

Ref: 1c

**Aircraft type and registration:** Scheibe SF 25E G-BFHN motor-glider

**No & Type of engines:** 1 Limbach SL 1700 EA1

**Year of Manufacture:** 1977

**Date and time (UTC):** 15 November 1986 at 1155 hrs

**Location:** Shrivenham

**Type of flight:** Training

**Persons on board:** Crew — 2                      Passengers — None

**Injuries:** Crew — None                      Passengers — N/A

**Nature of damage:** Extensive

**Commander's Licence:** Private Pilot's Licence

**Commander's Age:** 51 years

**Commander's Total Flying Experience:** 710 hours (of which 120 were on type)

**Information Source:** Aircraft Accident Report Form submitted by the pilot

The purpose of the flight was dual instruction of a pre-solo student pilot. The weather was good with a 10 knot wind, excellent visibility and no significant cloud. At 250 feet on the fourth circuit of the session, the instructor closed the throttle to simulate a cable-break and instructed the student to make an approach to a field adjacent to the airfield. The student initiated a poorly co-ordinated turn to the left and extended the spoilers. These actions generated a very high rate of descent and the instructor decided to abandon the approach by applying power and instructing the student to close the spoilers. Despite these actions, the aircraft struck the ground heavily in a normal landing attitude and the propeller hit the ground. After striking the ground, the aircraft bounced to such a height that the instructor considered that a landing in the chosen field was no longer possible. Although the engine was now delivering reduced power, height could be maintained and the instructor elected to turn through 180 degrees and land back on the airfield. During this turn however, the left wing dropped and struck the ground causing the aircraft to crash short of the airfield. The aircraft sustained extensive damage but both occupants evacuated the wreckage without significant injury.

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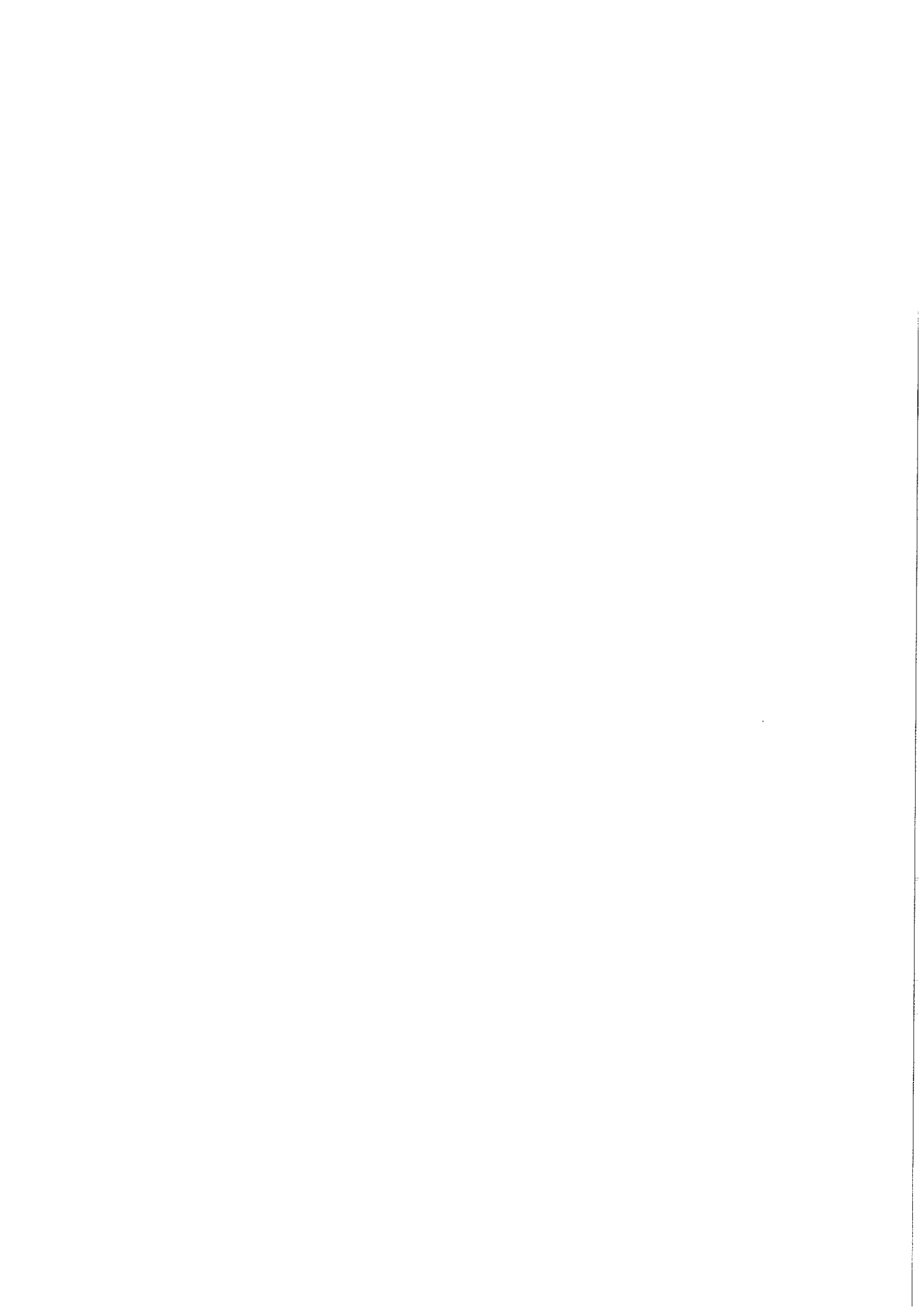
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2 86-24-03 R1

26 foot conical, P/N 2412-501

Color Pattern: All White

599093

To prevent use of affected canopies as FAA approved canopies, due to understrength material, remove or obliterate TSO-C23b marking prior to next use after receipt of this priority letter AD, unless already accomplished.

NOTES: (1) Pioneer Parachute Company Safety Notice, dated December 22, 1986, applies to this AD.

(2) Investigation is continuing, and this AD may be amended in light of the results of the investigation.

Upon request, an equivalent means of compliance with the requirements of this priority letter AD may be approved by the Manager, Boston Aircraft Certification Office, ANE-150, Aircraft Certification Division, Federal Aviation Administration, New England Region, 12 New England Executive Park, Burlington, Massachusetts 01803.

Federal Register publication to follow.

The provisions of Priority Letter AD 86-24-03 became effective upon receipt.

This priority letter AD amends Priority Letter AD 86-24-03 and is effective immediately upon receipt.

FOR FURTHER INFORMATION CONTACT:

Terry Fahr, Boston Aircraft Certification Office, ANE-153, Aircraft Certification Division, Federal Aviation Administration, New England Region, 12 New England Executive Park, Burlington, Massachusetts 01803, telephone (617) 273-7103.

**PIONEER PARACHUTE**  
**Airworthiness Directive**  
**Revision**  
**VOLUME I**

86-24-03 R1 PIONEER PARACHUTE COMPANY: Priority letter issued November 21, 1986, and is amended by this priority letter issued January 13, 1987. Applies to Pioneer Parachute Company K-XX, K-XXII and 26 foot conical canopies with the following serial numbers:

K-XX, P/N 5375-1

Color Patterns: Light Blue Upper Panels and Royal Blue Lower Panels or Yellow Upper Panels and Tan Lower Panels

598162	598927	598966	599000	599043
598318	598928	598967	599001	599048
598865	598929	598968	599004	599049
598866	598930	598969	599005	599050
598923	598937	598970	599006	599051
598924	598960	598971	599008	599087
598925	598961	598972	599009	599165
598926	598965	598995	599042	599166

Color Patterns: Light Blue Upper Panels and Tan Lower Panels or Yellow Upper Panels and Tan Lower Panels

598307	598345	598364	598526	598535
598317	598346	598366	598527	598536
598320	598347	598367	598528	598537
598340	598348	598521	598529	598545
598341	598349	598522	598530	598571
598342	598350	598523	598531	598572
598343	598351	598524	598532	598592
598344	598363	598525	598533	598863

Color Pattern: White Panels

598539	598550	598843	598998	599563
598540	598552	598844	598999	599613
598541	598553	598845	599002	599614
598542	598554	598858	599003	599640
598546	598555	598864	599007	599701
598547	598556	598962	599164	599702
598548	598579	598996	599561	599703
598549	598842	598997	599562	599711

K-XXII, P/N 5418-1

Color Pattern: Light Blue and Royal Blue Alternating Gores:

598557	598561	598565	598569	599076
598558	598562	598566	598650	599441
598559	598563	598567	598651	599638
598560	598564	598568	599044	599639

BRATNS/3/87

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598923	598937	598970	599006	599051
598924	598960	598971	599008	599087
598925	598961	598972	599009	599165
598926	598965	598995	599042	599166

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598307	598345	598364	598526	598535
598317	598346	598366	598527	598536
598320	598347	598367	598528	598537
598340	598348	598521	598529	598545
598341	598349	598522	598530	598571
598342	598350	598523	598531	598572
598343	598351	598524	598532	598592
598344	598363	598525	598533	598863

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598542	598554	598858	599003	599640
598546	598555	598864	599007	599701
598547	598556	598962	599164	599702
598548	598579	598996	599561	599703
598549	598842	598997	599562	599711

K-XXII, P/N 5418-1

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598557	598561	598565	598569	599076
598558	598562	598566	598650	599441
598559	598563	598567	598651	599638
598560	598564	598568	599044	599639



GLASER-DIRKS DG-400 SERIES MOTOR GLIDERS

<u>CAA AD No.</u>	<u>Associated Material</u>	<u>Description</u>	<u>Applicability - Compliance - Requirement</u>
		<u>PART 1 - LUFTFAHRT-BUNDESAMT AIRWORTHINESS DIRECTIVES</u>	
83-171		Flexible wing fuel tanks.	Applicable to DG-400 Serial Nos as detailed in Airworthiness Directive. Compliance required as detailed in Airworthiness Directive. Glaser-Dirks Technical Note 826/3 also refers.
84-155		Rotax 505 engine, canopy jettison device, DEI, towing cable release mechanism.	Applicable to DG-400 Serial Nos 4-1 to 4-87. Compliance required as detailed in Airworthiness Directive. Glaser-Dirks Technical Note 826/6 also refers.
84-157		Power plant, vibration cracks.	Applicable to DG-400 all Serial Nos. Compliance required as detailed in Airworthiness Directive. Glaser-Dirks Technical Note 826/11 also refers.
85-219		Replacement of fuel shut off valve gaskets.	Applicable to DG-400 Serial Nos 4-1 to 4-140. Compliance required as detailed in Airworthiness Directive. Glaser-Dirks Technical Note 826/14 also refers.
85-223		Powerplant - cable guides - inspection to prevent possible fouling of engine extension.	Applicable to DG-400 Serial Nos 4-1 to 4-140. Compliance required as detailed in Airworthiness Directive. Glaser-Dirks Technical Note 826/15 also refers.

<u>CAA AD No</u>	<u>Associated Material</u>	<u>Description</u>	<u>Applicability - Compliance - Requirement</u>
86-138	Improved marking of canopy emergency release and re-location of ventilation placard.	Applicable to DG-400 Serial Nos 4-1 to 4-176. Compliance required as detailed in Airworthiness Directive. Glaser-Dirks Technical Note 826/16 also refers.	

# *Civil Aviation Authority*

## FOREIGN AIRWORTHINESS DIRECTIVES Volume III

(A)

Issue 1  
November 1983

### PIK 20 SERIES SAILPLANES

<u>CAA AD No.</u>	<u>Associated Material</u>	<u>Description</u>	<u>Applicability - Compliance - Requirement</u>
PART 1 - DEPARTMENT OF CIVIL AVIATION HELSINKI AIRWORTHINESS DIRECTIVES			
ML200/83	Inspection of fuel hose clips.	Applicable to all PIK 20E sailplanes. Compliance in accordance with Airworthiness Directive.	

<u>CAA AD No</u>	<u>Associated Material</u>	<u>Description</u>	<u>Applicability - Compliance - Requirement</u>
86-138		Improved marking of canopy emergency release and re-location of ventilation placard.	Applicable to DG-400 Serial Nos 4-1 to 4-176. Compliance required as detailed in Airworthiness Directive. Glaser-Dirks Technical Note 826/16 also refers.

## Civil Aviation Authority

FOREIGN AIRWORTHINESS DIRECTIVES  
Volume III

(A)

Issue 1  
November 1983

### PIK 20 SERIES SAILPLANES

<u>CAA AD No.</u>	<u>Associated Material</u>	<u>Description</u>	<u>Applicability - Compliance - Requirement</u>
		PART 1 - DEPARTMENT OF CIVIL AVIATION HELSINKI AIRWORTHINESS DIRECTIVES	
M1200/83		Inspection of fuel hose clips.	Applicable to all PIK 20E sailplanes. Compliance in accordance with Airworthiness Directive.





No: 2/87 A.I.B.

Ref: 1c

Aircraft type and registration: Scheibe SF25B G-BGMV

No & Type of engines: 1 Stark-Stamo MS 1500/2 piston engine

Year of Manufacture: 1969

Date and time (UTC): 31 August 1986 at 1535 hrs

Location: Pocklington Airfield, Nr York

Type of flight: Training

Persons on board: Crew — 2 Passengers — None

Injuries: Crew — 1 (minor) Passengers — N/A

Nature of damage: Minor displacement of wheelbox

Commander's Licence: Private Pilot's Licence and SLMG

Commander's Age: 57 years

Commander's Total Flying Experience: 1820 hours (of which 435 were on type)

Information Source: Aircraft Accident Report Form submitted by the pilot

The aircraft was approaching to land on runway 33 with the wind velocity 260/12 gusting to 16 knots. The student pilot maintained 55 knots on the approach, applying full spoiler during the final stages and rounding out at about 20 feet. During the roundout, the airspeed decayed rapidly, resulting in a loss of elevator effectiveness and consequent heavy landing.

The commander suffered a minor back injury which necessitated hospitalisation over some days for observation. He had stated that a lack of appreciation of the effects of wind gradient and the failure to retract the spoilers during landing were the major contributory factors to the accident.

WHY NOT TRY SOME ENERGY ABSORBING  
RUBBER FROM DR TONY SEGAL - LASHAM?

5. SMOKE FROM ALTERNATOR INOPERATIVE SWITCH UNIT

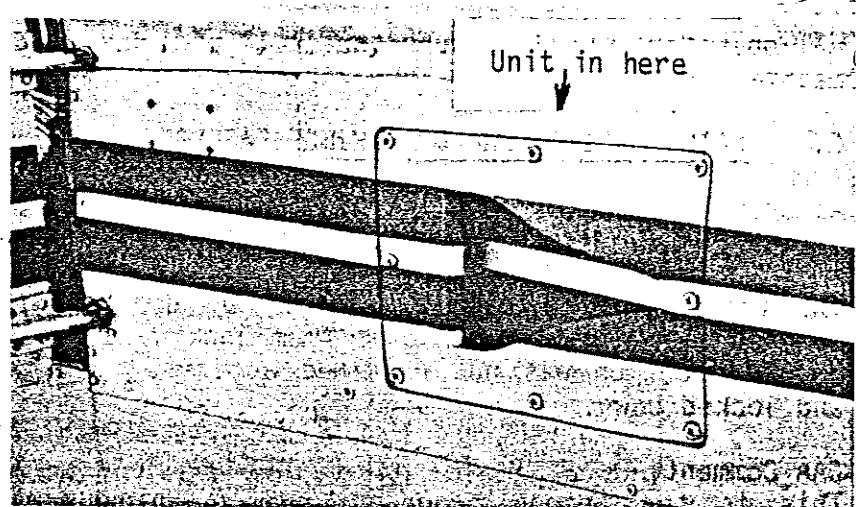
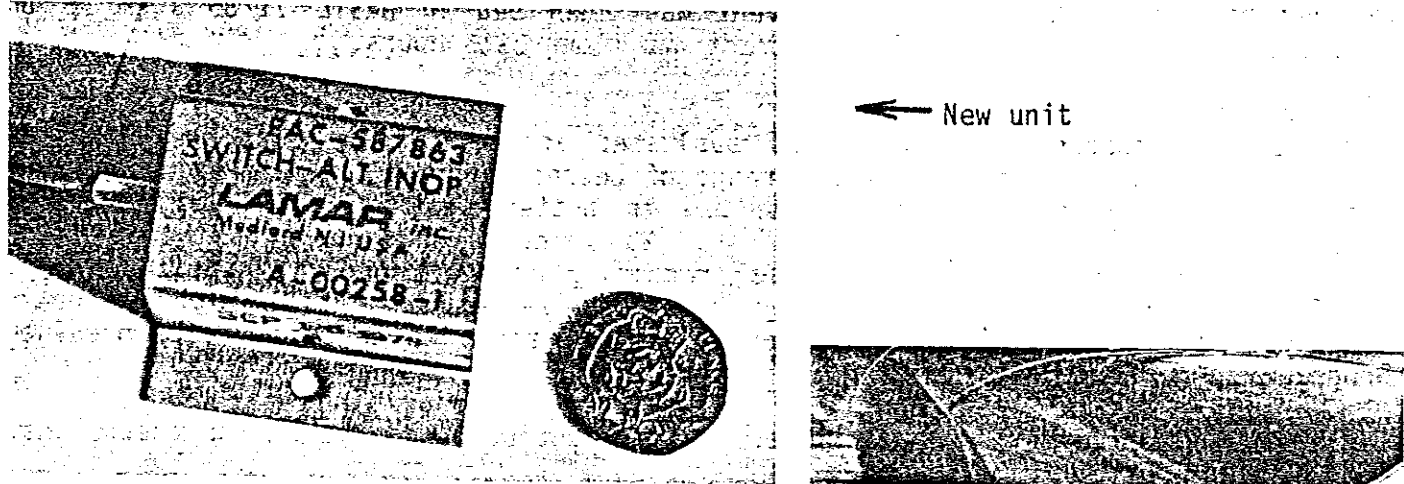
P/E

Aircraft : Piper PA38 Tomahawk Regn : G-BLXX (applicable to other aircraft)  
Date : December 1986  
Reportable Accident at Walthamstow, East London

The aircraft made an emergency landing in a builtup area after the pilot made a radio call 'smoke in cabin, making emergency landing'. The passenger was killed and the pilot seriously injured.

Preliminary AIB investigation found that an electrical unit, mounted on the forward lower right hand cabin wall behind the instrument panel, had overheated and burst, discharging smoke and acrid fumes into the cabin. This electrical unit was the 'Alternator Inoperative Switch', Part number 587863, manufactured by LAMAR, number A00258-1, in 1978. The function of this unit was to sense the output voltage from the alternator, via the auxiliary terminal, and trigger the alternator inoperative warning light in the cockpit when the voltage dropped below a preset value. The unit was solid state, encapsulated in a form of epoxy resin and approximately the size of a matchbox. Tests on the resin showed that it produced very toxic fumes when heated to a temperature that would cause the discolouration and charring as seen on the failed unit.

The 5 amp in-line fuse between the alternator and the switch was of the correct rating and had blown.



CAA Comment: It should be borne in mind that smoke and fumes may often be the result of an electrical fault and therefore the master switch should be put to off as quickly as possible to see if the smoke and fumes clear or reduce. Fumes may be toxic and therefore maximum ventilation either through DV window or air vents should be made available. SDAU records do not indicate any other failures of this small "potted" unit used in the alternator failure light circuit. A similar unit is known to be fitted in the Piper PA46 Malibu.

5. SMOKE FROM ALTERNATOR INOPERATIVE SWITCH UNIT

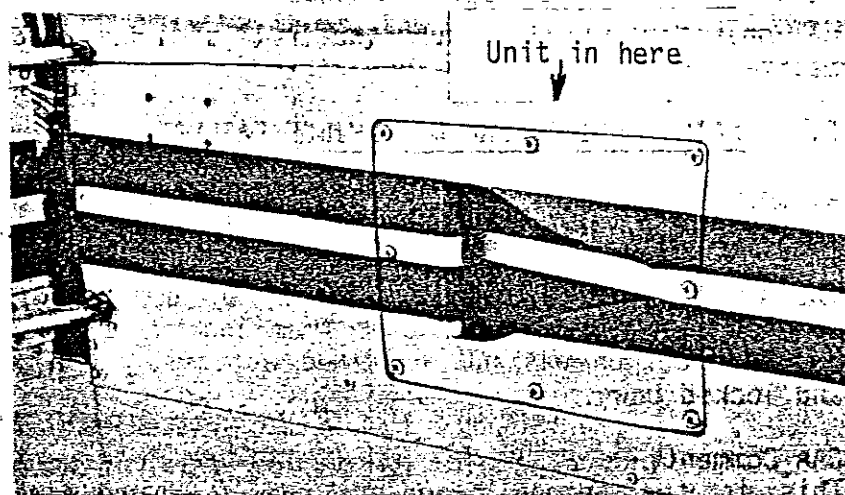
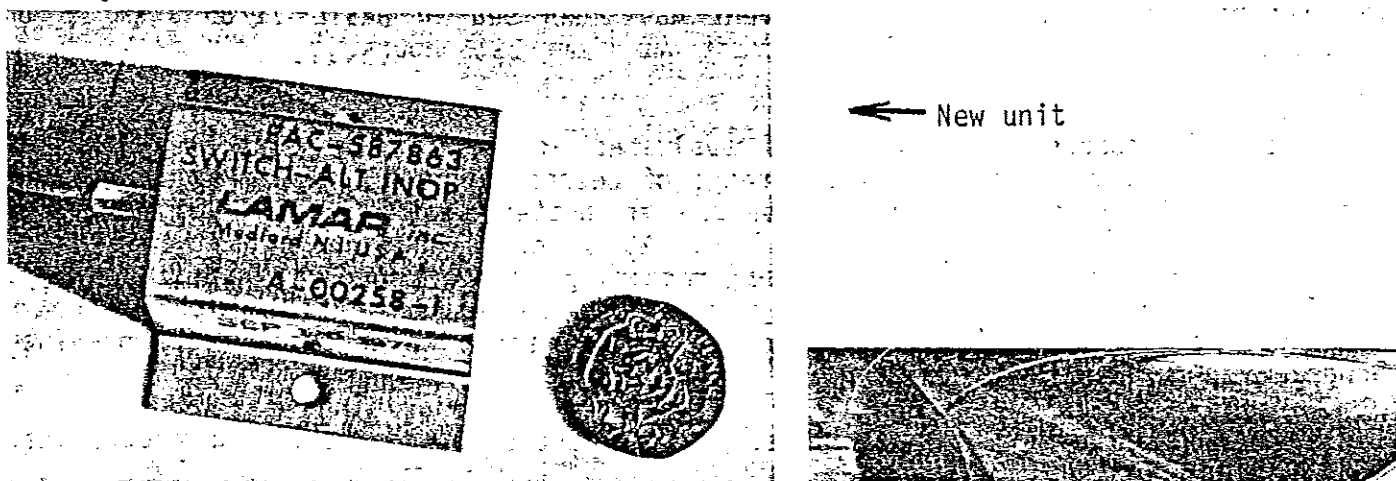
P/E

Aircraft : Piper PA38 Tomahawk Regn : G-BLXX (applicable to other aircraft)  
 Date : December 1986  
 Reportable Accident at Walthamstow, East London

The aircraft made an emergency landing in a builtup area after the pilot made a radio call 'smoke in cabin, making emergency landing'. The passenger was killed and the pilot seriously injured.

Preliminary AIB investigation found that an electrical unit, mounted on the forward lower right hand cabin wall behind the instrument panel, had overheated and burst, discharging smoke and acrid fumes into the cabin. This electrical unit was the 'Alternator Inoperative Switch', Part number 587863, manufactured by LAMAR, number A00258-1, in 1978. The function of this unit was to sense the output voltage from the alternator, via the auxiliary terminal, and trigger the alternator inoperative warning light in the cockpit when the voltage dropped below a preset value. The unit was solid state, encapsulated in a form of epoxy resin and approximately the size of a matchbox. Tests on the resin showed that it produced very toxic fumes when heated to a temperature that would cause the discolouration and charring as seen on the failed unit.

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REF TNS/1/87

# MARINE BUILDERS' TRAINING TRUST

COURSE PROGRAMME

0703/446824

## GRP COURSE DATES

AND

## CONDITIONS

<u>COURSE</u>	<u>DATE</u>
<del>GRP HAND LAMINATING SKILLS COURSE**</del>	<del>27TH OCTOBER 1986</del>
<del>GRP HAND LAMINATING SKILLS COURSE**</del>	<del>26TH JANUARY 1987</del>
<del>ADVANCED FRP TECHNIQUES COURSE</del>	<del>9TH FEBRUARY 1987</del>
<del>GRP HAND LAMINATING SKILLS COURSE**</del>	<del>9TH MARCH 1987</del>
ADVANCED FRP TECHNIQUES COURSE	6TH APRIL 1987
GRP HAND LAMINATING SKILLS COURSE**	1ST JUNE 1987
GRP HAND LAMINATING SKILLS COURSE**	22ND JUNE 1987
ADVANCED FRP TECHNIQUES COURSE	29TH JUNE 1987
GRP HAND LAMINATING SKILLS COURSE**	20TH JULY 1987

\*\* INCLUDING CITY & GUILDS SKILL TEST

Whilst every effort will be made to run the courses shown, the Trust reserves the right to cancel any courses that do not attract sufficient bookings.

## FEES

GRP HAND LAMINATING SKILLS COURSE (INCLUDING CITY & GUILDS TEST FEE)	<u>£160.00</u>
ADVANCED FRP TECHNIQUES COURSE	<u>£215.00</u>

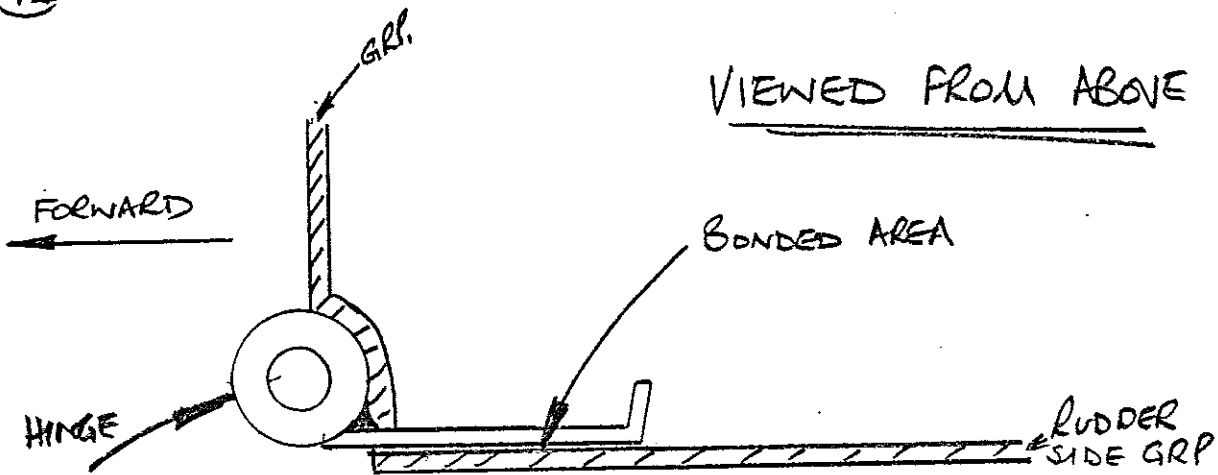
## CONDITIONS

50% of all fees will be charged for bookings cancelled less than two weeks before the course starts. No refund can be made in respect of cancellations received by the Trust after this period.

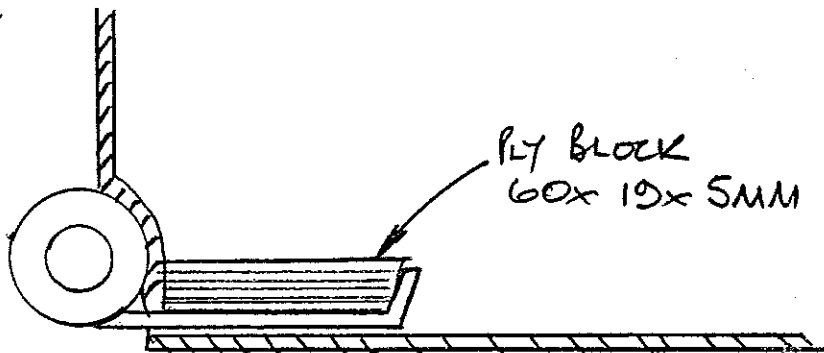
## ACCOMMODATION

Ample accommodation is available in guest houses and hotels in and around Southampton. A list will be sent with the joining instructions.

(A)



(B)

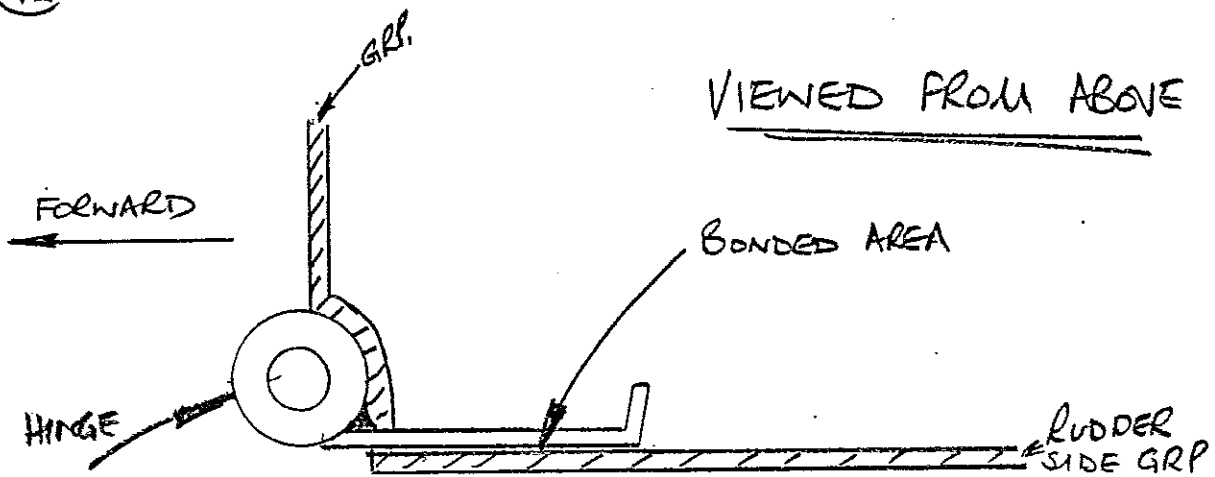


ASTIR CS. Rudder HINGE - BOND FAILURE.

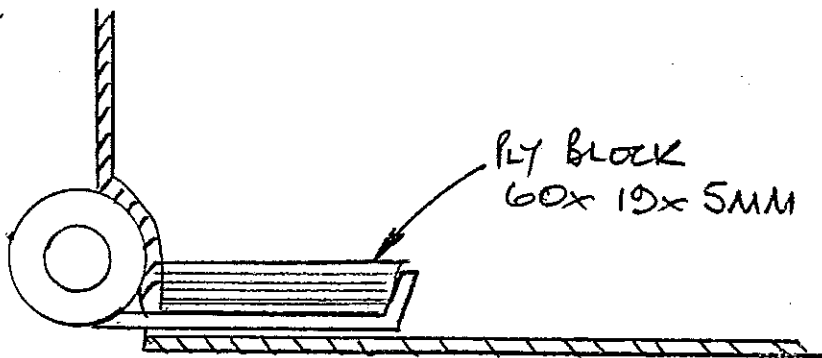
TNS/3/87

ASTIR CS WORK NO 1023

(A)



(B)



ASTIR CS. RUDDER HINGE - BOND FAILURE.

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## WINCH CABLE.

### IMPORTANT INSTRUCTIONS FOR PREPARING GLIDER TOWING WIRE FOR WINCH OPERATION

Although 4/5 mm 7 x 7 galvanized wire rope is widely used it does require special preparation on the ground as well as careful initial launches.

Please follow our instructions carefully to ensure trouble free operation.

1. On receipt of new wire draw off total length from the top of the reel, not from the bottom of the reel.
2. Anchor one end to winch and the other to a tractor or similar weight vehicle. Draw in the total length on to the winch at a slow speed, say 10 mph. This settles the lay of the wire and increases the torsional stability of the wire.
3. We strongly recommend that the first five launches are carried out with extreme care.

Under no circumstances should the glider pilot release the cable under high load as this could cause the wire to kink.

4. We recommend that no swivel be used in the final connection to the glider.

WINCH ROLLERS etc.

**T**his article is written to try and help any club operating a winch which suffers cable related problems during launching.

I began gliding in 1980 at Shalbourne Soaring Society's Rivar Hill Airfield where we now use a twin drum winch and stranded cable. We were suffering a relatively poor launch rate due mainly to cable breaks, but also a few snarl-ups. When giving the winch a Di one morning I checked over the paying-in assemblies where the cable enters the winch. What a mess! The lot looked clapped out, was poorly constructed and of inherently bad design.

The problems were identified as:

1. Insufficient attention to bearings.
2. Materials used were in their raw state, *ie* not heat treated in any way.
3. Inadequate strength thanks to the poor design.
4. The pulley grooves were too narrow to allow easy passage for cable knots.

Let's look at what happens to the revolving components in the paying-in box during a typical 50kt launch, assuming no head wind component. At some stage during the launch, and possibly for much of the launch, the winch is recovering cable at 50kt. If we assume that the pulley diameter the cable runs on is 4" (100mm) then it is revolving at 4835rpm! Now look at the vertical guide rollers in front of the pulleys. Being 1.5" (38mm) diameter they are whizzing round at 12894rpm. And the original guide rollers were only 1" (25mm) in diameter *and* running as pieces of tube straight on to shafts with no bearings. All this trying to rotate under load albeit intermitently - with inadequate lubrication at 19342rpm or nearly 323 revs/sec. No wonder then the cable wore grooves in them and on more than one occasion cut them in half when they seized on their shafts.

Thus anything less than proper ball-bearings will not do. Further due to the hostile operating environment *ie* open to the elements and the potential for the introduction of dirt and small strands of cable etc, the bearings used should be protected by rubber seals and metal guards. Bear in mind also the considerable pressures of

## SOLVING CABLE PROBLEMS

Colin, now in a Pirat syndicate, is a precision engineer and after taking a critical look at his club's winch decided that improvements could be made to help eliminate cable breaks

launching a heavy two-seater with a cable that has a few lumpy knots in it and you'll begin to appreciate the need for equipment that can cope continuously with these conditions. Add intensive use and possible winch driver hamfistedness and the problems become more acute. Finally it all gets worse at 60kt!!

Being a precision engineer I began looking at ways of resolving these problems. These are my findings and the solutions to problems mentioned earlier.

1. Use a heavier cable. We now use 5mm (6/7 strands).
2. To accommodate the heavier cable and correspondingly larger knots we doubled the overall pulley width to 2" (50mm).
3. The pulleys revolved on a pair of rubber sealed ball-bearings.
4. These pulleys were designed to incorporate metal bearing shields.
5. The pulleys were recessed into their mounting plates in order to prevent the cable becoming trapped between the plates and the pulleys.
6. The pulleys were case-hardened to a depth of .030" (.76mm).
7. The vertical guide rollers were case-hardened to .030 (.76mm) and fitted with rubber sealed bearings, but the metal shields proved impractical due to size limitations. We opted for case-hardened components

instead of hardening and tempering for three reasons. First, the tempering process reduces the absolute hardness of the surface. Secondly steels which harden and temper are much more expensive than mild steel which is case-hardened. Thirdly, when wear has taken place due to cable friction a case-hardened pulley can be easily refurbished by machining through the case and then again case-hardening.

Since we introduced these measures our incidence of cable breaks has dropped to negligible proportions. We enjoy smoother launches and the paying-in boxes require virtually no maintenance. Also the life of the cable has been dramatically extended, due not only to less arduous operating conditions but also because the friction with the hardened faces tends to slightly work harden the outer surfaces of the cable.

Precision engineering is not cheap, but compared to garage servicing charges for example, it's certainly not expensive. The problem for most clubs is a lack of suitable knowledge concerning the availability of precision engineering companies willing and able to undertake such design and construction.

I would be happy to give any further advice or information should your club wish to make use of it. My address is 3 Longacre, Oaken Grove, Newbury, Berks RG14 6DX and works' telephone No. 0635 45450 and home No. 0635 32518.

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